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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------------------|------------------------|
| 09/691,083 | 10/18/2000 | Milton J. Boden JR. | IR1444 Div. (2-2480) | 7041 |
| 2352 7590 12/27/2007 OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403 | | | EXAMINER FOURSON III, GEORGE R | |
| | | | ART UNIT 2823 | PAPER NUMBER |
| | | | MAIL DATE 12/27/2007 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/691,083

Applicant(s)

BODEN ET AL.

Examiner

George Fourson

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-7,9 and 11-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/22/07 has been entered.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,7,9,11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinzer et al 5338693 in combination with Wang et al 4376672.

Kinzer et al discloses a radiation resistant MOSFET wherein the 700-900 Å (col.6, lines 1-9) gate oxide is formed late in the process to avoid thermal cycling (abstract and col.2, lines 23-35), which is the method disclosed by applicant to obtain a MOSFET "capable of resisting single event gate rupture due to single event effect". The reference discloses that P-channel devices are affected by radiation (col.1, lines 18-26) and that the disclosed process is useful in formation of P-channel devices although formation of N-

channel devices is exemplified (col.4, lines 6-13). The process disclosed includes providing a silicon wafer with an epitaxial layer thereon (col.4, lines 13-16), implanting to form P-type body region 44 with P⁺ region 42 adjacent the upper surface (see instant claim 7), subsequent formation of a gate oxide by dry oxidation at 975°C to 1000°C (col.7, lines 57-65), which is one of applicant's preferred methods of gate oxide formation (instant page 14, line 11) formation of a gate doped with P (col.6, lines 15-24) formation of a low temperature oxide, PSG, ILD (col.7, lines 4-14) and formation of source contact and passivation layer (col.7, lines 23-31). Formation of N-channel devices would entail reversal of conductivity types by definition.

The reference does not disclose that the device is capable of resisting single event gate rupture due to single event effect". However, the device would have the recited property because it is the same device disclosed by applicant to exhibit such a property. Furthermore, no particular amount of "resistance" is recited.

The reference does not disclose forming tapered contact openings through the PSG interlayer dielectric layer to the source/drain regions at the step of figure 13.

Wang et al discloses forming tapered contact openings through a PSG layer to source/drain regions in a MOSFET device (col.11, lines 23+).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Kinzer et al and Wang et al to enable the disclosed contact opening formation step of Kinzer et al to be performed according to the teachings of Wang et al because one of ordinary skill in the art would have been motivated to look to analogous art teaching alternative suitable or useful methods of performing the disclosed contact opening formation step of Kinzer et al step of Kinzer et al and art recognized suitability for an intended purpose has been recognized to be motivation to combine. MPEP 2144.07.

Claims 3-6 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinzer et al as applied to claims 1,7,9,11 and 12 above, and further in view of the following argument.

With respect to claim 3, there is overlap between the recited range and that of Kinzer et al.

With respect to claims 4 and 5, the concentration of the channel region of the device of Kinzer is a result of the energy and dose of the implants to form regions 44 and 42 as well as the duration and temperature of the annealing steps subsequent to the doping steps. The concentration would correspond to the recited values in part because there is no particular correspondence recited. Further, one of ordinary skill in the art would have been led to the recited channel concentration through routine experimentation to achieve desired device performance including desired source/drain resistance.

With respect to claim 6, the reference discloses the effect of epitaxial layer thickness and doping level on device performance. One of ordinary skill in the art would have been led to the recited doping level to achieve desired device performance.

With respect to claim 13, one of ordinary skill in the art would have been led to the recited doping level to achieve desired gate resistance and associated device performance.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Fourson whose telephone number is (571)272-1860/272-1860. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from

Art Unit: 2823

either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



George Fourson
Primary Examiner
Art Unit 2823

GFourson
December 17, 2007